



ROBYN SILK

CURIUM

Element Symbol: **Cm**

Atomic Number: **96**

An initiative of IYC 2011 brought to you by the RACI



International Year of
CHEMISTRY
2011



Royal Australian Chemical Institute

www.raci.org.au

CURIUM

Element symbol: **Cm**

Atomic number: **96**

Curium is a radioactive metallic element of the actinide series, and named after Marie Skłodowska-Curie and her husband Pierre, who are noted for the discovery of Radium. Curium was the first element to be named after a historical person.

Curium is a synthetic chemical element, first synthesized in 1944 by Glenn T. Seaborg, Ralph A. James, and Albert Ghiorso at the University of California, Berkeley, and then formally identified by the same research team at the wartime Metallurgical Laboratory (now Argonne National Laboratory) at the University of Chicago. The discovery of Curium was closely related to the Manhattan Project, and thus results were kept confidential until after the end of World War II. Seaborg finally announced the discovery of Curium (and Americium) in November 1945 on 'The Quiz Kids!', a children's radio show, five days before an official presentation at an American Chemical Society meeting.

The first radioactive isotope of Curium discovered was Curium-242, which was made by bombarding alpha particles onto a Plutonium-239 target in a 60-inch cyclotron (University of California, Berkeley). Nineteen radioactive isotopes of Curium have now been characterized, ranging in atomic mass from 233 to 252. The most stable radioactive isotopes are Curium-247 with a half-life of 15.6 million years, Curium-248 (half-life 340,000 years), Curium-250 (half-life of 9000 years), and Curium-245 (half-life of 8500 years). All other Curium isotopes have half-lives that are less than 30 years, with most less than 33 days.

Minute amounts of Curium do probably exist in natural deposits of Uranium, as a result radioactive decay sustained by neutrons naturally present in Uranium ores, however natural Curium has never been detected.

Both Curium-242 and Curium-244 can be synthesized in gram amounts, which has enabled the determination of some of Curium's elemental properties. Curium is chemically similar to the rare earth element Gadolinium but has a more complex crystal structure. Curium metal is silvery-white, while most trivalent Curium (Cm^{3+}) compounds are slightly yellow.

Curium-244 and Curium-242 are also strong alpha (Helium ion) emitters, which make them useful as an alpha particle source. Curium-244 has been used in an Alpha particle X-ray spectrometer, which can analyse chemical element composition, on board several American and European space missions, including the Mars Exploration Rover and the Rosetta Orbiter/Philae Lander.

Curium absorbed into the body is very toxic because it accumulates in bone tissue where its radiation destroys bone marrow and stops red blood cell creation.

Provided by the element sponsor Kathryn Linge

ARTISTS DESCRIPTION

Being a radioactive element, I've chosen the yellow background as a recognised colour behind most symbols of radiation.

The background layer is a relief roll, over a heavily etched plate. This layer has a multiple representation for me and relates to the Manhattan Project and the development of the first atomic bomb during World War II. When Curium deposits in the body it accumulates in the liver, lungs and bone marrow where the cessation of red blood cell production creates cancer and tumours.

The yellow layer of this print symbolises an imagined microscopic view of cancer along with the yellow of the compound curium.

The top layer; a single block Woodcut, is the visual character for radiation and in this instance is an interpretation of curium decaying into plutonium.

ROBYN SILK